

TABLE 6. PROPOSED FIELD PROGRAM FOR SOIL INVESTIGATION

Sample Location	Sample Medium	Rationale	Number of Sample Locations	Sample Identification	Sampling Tool	Sampling Depth (ft bgs)	Analysis									
							Field Screening by PID	VOCs (includes EDB)	PAHs (SIM)	SVOCs	TAL Metals (includes Mercury)	Cyanide	Hexavalent Chromium	Pesticides	PCBs	Dioxins/ Furans
Lorraine Process Area																
Lorraine Process Area (LPA)	Surface soil	To assess potential source areas and delineate nature and extent	26	LPA-SB-01-0.5 through LPA-SB-26-0.5	Split spoon Continuous sampler PVC/acetate sleeve	0.0 - 0.5	Yes	26	26	26	26	26	0	0	0	0
	Subsurface soil		26	LPA-SB-01-2.0 through LPA-SB-26-2.0		0.5 - 2.0	Yes	26	26	26	26	26	0	0	0	0
			26	LPA-SB-01-6.0 through WPA-SB-26-6.0		2.0 -6.0	Yes	26	26	26	26	26	0	0	0	0
			26	LPA-SB-01-10.0 through LPA-SB-26-10.0		6.0 - 10.0	Yes	26	26	26	26	26	0	0	0	0
			26	LPA-SB-01-?? through LPA-SB-26-??		2 ft interval above refusal	Yes	26	26	26	26	26	0	0	0	0
Lorraine Process Area (LPA) Cooling Pond	Surface soil	To determine if cooling pond is a source area	4	LPA-SB-27-0.5 through LPA-SB-30-0.5	Split spoon Continuous sampler PVC/acetate sleeve	0.0 - 0.5	Yes	4	4	4	4	4	4	0	0	0
	Subsurface soil		4	LPA-SB-27-2.0 through LPA-SB-30-2.0		0.5 - 2.0	Yes	4	4	4	4	4	0	0	0	0
			4	LPA-SB-27-6.0 through WPA-SB-30-6.0		2.0 -6.0	Yes	4	4	4	4	4	0	0	0	0
			4	LPA-SB-27-10.0 through LPA-SB-30-10.0		6.0 - 10.0	Yes	4	4	4	4	4	0	0	0	0
			4	LPA-SB-27-?? through LPA-SB-30-??		2 ft interval above refusal	Yes	4	4	4	4	4	0	0	0	0
Wilcox Process Area																
Wilcox Process Area (WPA)	Surface soil	To assess potential source areas and delineate nature and extent	65	WPA-SB-01-0.5 through WPA-SB-65-0.5	Split spoon Continuous sampler PVC/acetate sleeve	0.0 - 0.5	Yes	65	65	65	65	65	Total 10 samples: 7 Randomly Selected Borings + WPA-SB-01-0.5 WPA-SB-01-0.5 WPA-SB-19-0.5	10	10	10
	Subsurface soil		65	WPA-SB-01-2.0 through WPA-SB-65-2.0		0.5 - 2.0	Yes	65	65	65	65	65	0	0	0	0
			65	WPA-SB-01 -6.0 through WPA-SB-65-6.0		2.0 -6.0	Yes	65	65	65	65	65	0	0	0	0
			65	WPA-SB-01 -10.0 through WPA-SB-65-10.0		6.0 - 10.0	Yes	65	65	65	65	65	0	0	0	0
			65	WPA-SB-01-?? through WPA-SB-65-??		2 ft interval above refusal	Yes	65	65	65	65	65	0	0	0	0
East Tank Farm Area																
East Tank Farm (ETF)	Surface soil	To assess potential source areas and delineate nature and extent	11	ETF-SB-01-0.5 through ETF-SB-11-0.5	Split spoon Continuous sampler PVC/acetate sleeve	0.0 - 0.5	Yes	11	11	11	11	11	0	0	0	0
	Subsurface soil		11	ETF-SB-01-2.0 through ETF-SB-11-2.0		0.5 - 2.0	Yes	11	11	11	11	11	0	0	0	0
			11	ETF-SB-01-6.0 through ETF-SB-11-6.0		2.0 -6.0	Yes	11	11	11	11	11	0	0	0	0
			11	ETF-SB-01-10.0 through ETF-SB-11-10.0		6.0 - 10.0	Yes	11	11	11	11	11	0	0	0	0
			11	ETF-SB-01-?? through ETF-SB-11-??		2 ft interval above refusal	Yes	11	11	11	11	11	0	0	0	0
East Tank Farm (ETF) Tanks 1 and 4	Surface soil	To determine if this is a source area	10	ETF-SB-12-0.5 through ETF-SB-21-0.5	Split spoon Continuous sampler PVC/acetate sleeve	0.0 - 0.5	Yes	10	10	10	10	10	0	0	0	0
	Surface soil		10	ETF-SB-12-2.0 through ETF-SB-21-2.0		0.5 - 2.0	Yes	10	10	10	10	10	0	0	0	0
Total Soil Samples								550	550	550	550	550	14	10	10	10
Soil Investigation QC																
Field Duplicates	Soil		1 per 10 samples					55	55	55	55	55	2	1	1	1
MS/MSDs	Soil		1 per 20 samples (extra volume only; not included in total sample count)					28	28	28	28	28	1	1	1	1
Total Soil Samples Associated with Soil Investigation								633	633	633	633	633	17	12	12	12
Water QC Samples																
Trip blanks	Water		1 per cooler containing equipment rinsate for equipment used in soil investigation					15	0	0	0	0	0	0	0	0
Equipment blanks	Water		1 per day per set of for nondedicated equipment per team					30	30	30	30	30	1	1	1	1
Total Water QC Samples Associated with Soil Investigation								45	30	30	30	30	1	1	1	1

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Sample Location	Sample Medium	Rationale	Number of Sample Locations	Sample Identification	Sampling Tool	Sampling Depth (ft bgs)	Analysis									
							Field Screening by PID	VOCs (includes EDB)	PAHs (SIM)	SVOCs	TAL Metals (includes Mercury)	Cyanide	Hexavalent Chromium	Pesticides	PCBs	Dioxins/ Furans
Background																
Background grid	Surface soil	Background	1	BKG-0.5	ICS Methodology Hand auger Slide hammer Scoop	0.0 - 0.5	Yes	0	1	0	1	0	0	0	0	1
Total Background Soil Samples								0	1	0	1	0	0	0	0	1
Background Soil QC																
Field Replicates	Soil		1 Duplicate (BKG-0.5-D) and 1 Triplicate (BKG-0.5-T)					0	2	0	2	0	0	0	0	2
MS/MSDs	Soil		1 per 20 samples (extra volume only; not included in total sample count)					0	1	0	1	0	0	0	0	1
Total Soil Samples Associated with Background								0	3	0	3	0	0	0	0	3
Water QC Samples																
Trip blanks	Water		1 per cooler containing equipment rinsate for equipment used in soil investigation					0	0	0	0	0	0	0	0	0
Equipment blanks	Water		1 per day per set of for nondedicated equipment per team					0	1	0	1	0	0	0	0	1
Total Water QC Samples Associated with Background Soil								0	1	0	1	0	0	0	0	1
NOTES: Sample depth will vary depending upon location of sample and depth of refusal; as a result, the number of samples collected may be less than shown. bgs = Below ground surface EDB = Ethylene dibromide ft = foot (feet) ICS = Incremental Composite Sampling MS = Matrix spike MSD = Matrix spike duplicate NORM = Naturally-occurring radioactive materials PAH = Polycyclic aromatic hydrocarbon PCB = Polychlorinated biphenyl PID = Photoionization detector PVC = polyvinyl chloride QC = Quality control SIM = Selective ion monitoring SVOC = Semivolatile organic compound TAL = Target Analyte List TPH = Total petroleum hydrocarbons VOC = Volatile organic compound																

TABLE 8. PROPOSED FIELD PROGRAM FOR PRIVATE SUPPLY WELL AND PIEZOMETER SAMPLING

Sample Location	Sample Identification	Sampling Method	Analyses										
			Field Parameters	LNAPL Characterization	VOCs (includes EDB)	PAHs (SIM)	SVOCs	TAL Metals (includes Mercury)	Cyanide	Hexavalent Chromium	Pesticides	PCBs	Dioxins/ Furans
East Tank Farm Residential Wells	GW-01	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
	GW-02	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
	GW-03	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
	GW-04	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
North of East Tank Farm Residential Wells	GW-05	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
	GW-06	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
	GW-07	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
South of East Tank Farm Residential Wells	GW-08	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
	GW-09	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
Lorraine Process Area Church Well	GW-10	Tap or Grab	1	1	1	1	1	1	1	1	0	0	0
North Tank Farm Residential Well	GW-11	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
North of North Tank Farm Residential Well	GW-12	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
Wilcox Residential Well	GW-13	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
East Tank Farm Private Wells Not In Use	GW-14	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
	GW-15	Tap or Grab	1	0	1	1	1	1	1	1	0	0	0
Total Investigation Tap Samples			15	1	15	15	15	15	15	15	0	0	0
Field duplicate	1 per 10 samples		0	0	2	2	2	2	2	2	0	0	0
MS/MSDs	1 per 20 samples (extra volume only; not included in total sample count)		0	0	1	1	1	1	1	1	0	0	0
Total Private Supply Well Samples			15	1	17	17	17	17	17	17	0	0	0
Water QC Samples													
Trip blanks	1 per cooler containing aqueous samples for VOC analysis		0	0	1	0	0	0	0	0	0	0	0
Equipment blanks	1 per day per set of for nondedicated equipment per team		0	0	0	0	0	0	0	0	0	0	0
Total Water QC Samples Associated with Private Supply Well Sampling			0	0	1	0	0	0	0	0	0	0	0
Piezometers													
Piezometers	PW-01 through PW-10	Low Flow	10	0	10	10	10	10	10	1	0	0	0
Total Investigation Tap Samples			10	0	10	10	10	10	10	1	0	0	0
Field duplicate	1 per 10 samples		0	0	1	1	1	1	1	1	0	0	0
MS/MSDs	1 per 20 samples (extra volume only; not included in total sample count)		0	0	1	1	1	1	1	1	0	0	0
Total Piezometer Samples			10	0	11	11	11	11	11	2	0	0	0
Water QC Samples													
Trip blanks	1 per cooler containing aqueous samples for VOC analysis		0	0	1	0	0	0	0	0	0	0	0
Equipment blanks	1 per day per set of nondedicated equipment per team		0	0	1	1	1	1	1	1	0	0	0
Total Water QC Samples Associated with Piezometer Sampling			0	0	2	1	1	1	1	1	0	0	0
NOTES: Field parameters: pH, temperature, conductivity, dissolved oxygen, oxidation-reduction potential, and turbidity bgs = Below ground surface EDB = Ethylene dibromide MS = Matrix spike MSD = Matrix spike duplicate PAH = Polycyclic aromatic hydrocarbon PCB = Polychlorinated biphenyl QC = Quality control SIM = Selective ion monitoring VOC = Volatile organic compound													

TABLE 9. PROPOSED FIELD PROGRAM FOR VAPOR INTRUSION INVESTIGATION

Sample Type	Proposed Sample Area	Matrix	Sample Method	Sample Frequency	Sample Interval	Sample Identification	No. of Sample Locations	
								TO-15 SIM /TO-15
Vapor Intrusion Samples								
Indoor Air/ Sub-Slab or Crawlspace	Lorraine Process Area (LPA) Church	Air/Soil Gas	TO-15: 6-Liter Summa canister with 24-hour regulator	1 sub-slab or crawlspace 1 indoor per location (sampled once in winter and once in summer)	Sub-slab taken below slab	For sub-slab or crawl space air sample: LPA-SS-01 or LPA-CS-01 For indoor air sample: LPA-IA-01	2	2
	Crawlspace taken in crawlspace				For sub-slab or crawl space air sample: LPA-SS-02 or LPA-CS-02 For indoor air sample: LPA-IA-02	2	2	
	Indoor air sample collected from within breathing zone (3 to 4 feet above ground surface) of the home				For sub-slab or crawl space air sample: WPA-SS-03 or WPA-CS-03 For indoor air sample: WPA-IA-03	2	2	
Background	Upwind of sample locations in open area			Locations around perimeter of sampling area	5 to 8 feet off the ground	LPA-VIBG-01, LPA-VIBG-02, WPA-VIBG-03	4	4
Field duplicate	As close as possible, in space and time, to the original sample			1 outdoor location 1 sub-slab 1 indoor	Same as original sample	Same as original with "D" added to the ID, for example LPA or WPA-SS-01D	3	3
Total Vapor Intrusion Samples							13	13
NOTE: SIM = Selective ion monitoring								

TABLE 4. QUALITY ASSURANCE INDICATOR CRITERIA

Indicator Parameter	Analytical Parameter	QC Sample ^a	Acceptance Criteria for Laboratory Analysis
Accuracy (percent recovery)	VOCs, EDB, SVOCs, PAHs, TPH, PCBs (Aroclors), Pesticides, Dioxins/Furans	MS MSD Blanks ^b	50 to 150 percent recovery (MS/MSD) Less than CRQL (blanks)
	TAL Metals, Mercury, Hexavalent Chromium, Cyanide, AVS-SEM	MS LCS Reference samples Blanks ^a	75 to 125 percent recovery (MS) 80 to 120 percent recovery (LCS) Limits per supplier (reference sample) Less than CRDL (blanks)
Precision (RPD)	VOCs, EDB, SVOCs, PAHs, TPH, PCBs (Aroclors), Pesticides, Dioxins/Furans	MS MSD Field duplicates	30 percent RPD (MS/MSD) 50 percent RPD (field duplicates)
	Background PAHs and Dioxins/Furans via ICS	Field replicates	30 percent RPD (field replicates)
	TAL Metals, Mercury, Hexavalent Chromium, Cyanide, AVS-SEM, Asbestos, General Chemistry Parameters	MS MSD or MD Field duplicates Laboratory duplicates	20 percent RPD (MS, MSD, MD aqueous) 35 percent RPD (MS, MSD, MD solid) 50 percent RPD (field duplicates) 25 percent (laboratory duplicates)
	Background TAL Metals via ICS	Field replicates	30 percent RPD (field replicates)
Sensitivity (quantitation limits)	Analytical tests	MS MD or MSD Field duplicates Laboratory duplicates	Not applicable
Completeness	The objective for data completeness is 90 percent.		
Representativeness	The sampling network and analytical methods for this site are designed to provide data that are representative of site conditions.		
Comparability	The use of standard published sampling and analytical methods, and the use of QC samples, will ensure data of known quality. These data can be compared to other data of known quality.		

NOTES:

^a Not all listed QC samples apply to all analytical parameters. QC samples are analytical method specific.

^b May include method blanks, reagent blanks, instrument blanks, calibration blanks, trip blanks and field blanks.

AVS = Acid-volatile sulfide

CRDL = Contract-required Detection Limit

CRQL = Contract-required Quantitation Limit

EDB = Ethylene bromide

ICS = Incremental Composite Sampling

LCS = Laboratory control sample

MD = Matrix duplicate

MS = Matrix spike

MSD = Matrix spike duplicate

PAH = Polycyclic aromatic hydrocarbon

PCB = Polychlorinated biphenyl

QC = Quality control

RPD = Relative percent difference

SVOC = Semivolatile organic compound

SEM = Simultaneously-extracted metal

TAL = Target Analyte List

TPH = Total petroleum hydrocarbons

VOC = Volatile organic compound

